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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Poor Management Oversight and Ineffective Incentives Leave NPOESS Program Well Over Budget And Behind Schedule

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Office of Inspector General

EXECUTIVE SUMMARY

In 1994, by Presidential Decision Directive, the National Oceanic and Atmospheric Administration (NOAA) merged its Polar Operational Environmental Satellite (POES) with the Department of Defense's Defense Meteorological Satellite Program to produce the National Polar-orbiting Operational Environmental Satellite System (NPOESS). NPOESS was envisioned as a single state-of-the-art environmental and climate monitoring system that would reduce duplication and significantly cut the cost of satellite operations engaged in obtaining critical meteorological data. Early estimates for NPOESS put life-cycle costs at $6.5 billion and set a deadline of March 2008 for the first satellite launch.

The merger assigned shared management to NOAA and Defense, along with NASA, whose experience with its own earth observing satellites is expected to improve NPOESS capabilities. The three agencies formed an Integrated Program Office (IPO) within NOAA to manage NPOESS and specified their individual responsibilities in a memorandum of agreement (MOA): NOAA is charged with overall management of the converged system and provided the system program director, who reports to the NOAA Administrator through the NOAA Assistant Administrator for the National Environmental Satellite, Data and Information Service (AA/NESDIS); DoD is the lead on acquisition matters; and NASA is the lead for promoting transition to new technologies. Because of the importance of NPOESS to national and global climate monitoring capabilities, overall program guidance was assigned to an executive committee (EXCOM) made up of top leadership from each agency: the Under Secretary of Commerce for Oceans and Atmosphere, the Under Secretary of Defense for Acquisition and Technology, and the NASA Deputy Administrator. Though not stipulated in the MOA, the agencies formed a steering committee to provide additional executive leadership: committee members include the assistant administrator for NESDIS and his counterparts at DoD and NASA, all of whom report to their agency's EXCOM member.

NPOESS acquisition plans call for, among other things, procurement of six satellites and development of seven instruments, including the Visible/Infrared Imager Radiometer Suite (VIIRS)[1]—one of four sensors considered critical to the program.

In August 2002, the IPO, using DoD's contracting authority, awarded a single satellite integration contract worth $4.5 billion to a prime contractor, incorporating previously-awarded sensor contracts as subcontracts to the prime. The prime contract included an award fee incentive arrangement to encourage outstanding performance, making it possible for the contractor to earn up to 20 percent of total estimated costs. It set three fee types for the first phase of the contract:

- Base fees are a guaranteed 2 percent of estimated costs, paid to the contractor automatically each billing period. The total base fee pool is $57,190,785.

- Award fees—capped at 13 percent of estimated contract cost or $369,294,988—are tied to the government's assessment of the contractor's performance in three broad areas: management, technical, and cost.

[1] VIIRS collects visible/infrared imagery and radiometric data. Data types include atmospheric, clouds, earth radiation budget, clear-air land/water surfaces, sea surface temperature, ocean color, and low light visible imagery.

- Mission success fees—capped at 5 percent of estimated contract cost or $136,817,498—are tied to the contractor's performance in meeting seven program milestones (called "events").

Criteria for the latter two fees are largely subjective. The plan also allows for unearned award and mission fees from one billing period to be transferred to subsequent periods, giving the contractor additional opportunities to earn them.

NPOESS Cost Overruns Cause Nunn-McCurdy Breach

The Nunn-McCurdy provision of the FY 1982 National Defense Authorization Act requires the Secretary of Defense to notify Congress when unit costs for a major acquisition program such as NPOESS grow by 15 percent[2] over original baseline estimates. Should costs grow by 25 percent, the act requires the Secretary of Defense to certify in writing that the program is essential to national security, more cost-effective alternatives do not exist, the new cost estimate is reasonable, and a management structure is in place to adequately manage and control unit costs. Failure to provide this certification would terminate DoD's involvement in the program. Such a termination would have a devastating impact given that DoD provides half the program's funding.

On September 28, 2005, program officials notified Congress that NPOESS costs had grown by at least 15 percent, largely because of problems with VIIRS. In November 2005, the Government Accountability Office (GAO) informed Congress that life-cycle cost estimates for NPOESS are likely to grow to $9.7 billion, and the launch of the first NPOESS satellite is at least 17 months behind schedule.[3] That same month, an estimate prepared for NPOESS by DoD's Cost Analysis Improvement Group showed that cost growth had exceeded 25 percent, triggering the Nunn-McCurdy certification requirement.

At the time the Nunn-McCurdy breach was identified, NPOESS was more than $3 billion over budget and well behind schedule, yet the contractor had received more than $123 million—*84 percent*—of available incentive payments. Our review uncovered two overarching management and contract weaknesses that contributed to the unchecked cost and schedule overruns.

EXCOM Did Not Effectively Challenge Optimistic Assessments of the Impact of VIIRS Problems on NPOESS

The information that the problems with the VIIRS sensor would delay the NPOESS launch took observers of the program by surprise. We began our audit in part because of our own concerns and those expressed by members of Congress and OMB staff that the IPO either did not identify VIIRS problems or, if identified, did not bring them to the attention of EXCOM or other senior management. In fact, the opposite was true. Although we found that information sharing was not effective between the contractor, the VIIRS subcontractor, and the IPO at the outset of the

[2] 10 U.S.C § 2433.

[3] U.S. Government Accountability Office, November 2005. *Polar-Orbiting Environmental Satellites—Technical Problems, Cost Increases, and Schedule Delays Trigger Need for Difficult Trade-off Decisions,* GAO-06-249T. Washington, D.C: GAO.

program, as VIIRS problems persisted, the IPO and prime contractor took steps to improve communication, as well as increase their oversight of the VIIRS subcontractor. Beginning in December 2002, the IPO submitted monthly status reports to EXCOM that consistently described in explicit detail the growing costs and delays attributable to VIIRS development and delivery. Yet until March 2005 the program director maintained that these problems would be solved within available funding reserves and the overall NPOESS schedule. All the while, earned value measures—which reflect program cost and schedule status against goals—were deteriorating and funding reserves were being consumed at an unsustainable rate: by August 2004, 92 percent of the contractor's reserve ($135 million out of $147 million) had been spent or allocated.

Despite mounting evidence of the seriousness of the VIIRS problems, EXCOM did not effectively challenge the director's optimistic assessments, and from May 2003 through December 2004, convened only twice to consider the program's status. Finally, in 2005, after the IPO reported that VIIRS problems would indeed delay the first satellite launch, EXCOM began meeting more often to investigate problems and their impact. Unfortunately, by then it was too late to turn the program around: EXCOM's long-term inattention had, in effect, postponed critical evaluations and decisions needed to replan the program's faltering elements and contain cost and schedule overruns. (See page 8.)

After the Nunn-McCurdy review is complete and assuming the program is certified, EXCOM must provide vigilant oversight to ensure NPOESS stays on track. The Commerce Deputy Secretary should ensure that the Under Secretary for Oceans and Atmosphere in his role on the EXCOM works with the other members of the EXCOM to obtain regular, independent evaluations of the status of NPOESS, with a special focus on thoroughly assessing progress toward completing high-risk or otherwise critical tasks. (See page 12.)

Contractor Received Excessive Award Fees for a Problem-Plagued Program.

Award fees are supposed to motivate a contractor to strive for excellence in such performance areas as quality, timeliness, technical ingenuity, and cost-effective management. The NPOESS experience, however, clearly shows that this incentive structure does not always result in the intended caliber of performance. Despite ongoing, significant delays and cost overruns, the prime contractor received close to the maximum fee amounts for the first five billing periods—an average 90 percent of available incentive payments. At the end of period 4, for example, earned value measures showed the Space Segment of the program, which includes the critical VIIRS component, running 8 percent behind schedule and 16 percent over budget. VIIRS itself was 12 percent behind schedule and approximately 30 percent over budget. Nevertheless, the contractor received 92 percent of available award fees. By the end of period 5, the Space Segment was 9 percent behind schedule and 23 percent over budget, and the contractor even warned that it was unlikely to meet the dates for critical design review and first launch. Yet it received 82 percent of available award fees. It was only in period 6—which covered the 6 months prior to the Nunn-McCurdy breach—that the contractor's performance was rated "unsatisfactory." Even so, the prime received 48 percent of the potential fee amount—$10.7 million. (See page 17.)

These payments appear excessive and reflect an award fee plan whose evaluation criteria do not sufficiently focus on the completion of the most critical or high-risk tasks. It allows incentive payments for poor performance and, by rolling over unearned fee amounts from one period to another, gives the contractor multiple opportunities to earn incentive dollars. In addition, the potential fee pool of 20 percent is atypical: less than 1 percent of DoD award fee contracts recently reviewed by GAO provided award fees in excess of 15 percent of estimated costs. Finally, the plan gives total authority for setting fee amounts to a "fee determining official" who in the case of NPOESS, is also the program director. This individual's objectivity in assessing the contractor may well be compromised by his responsibility as program director for NPOESS's day-to-day management and his stake in the program's success. The fee payments for periods two through five made by the fee determining official routinely exceeded the recommendations made by the NPOESS award fee review board. It should be noted that GAO's review of Defense contracts pointed out that DoD's fee determining officials typically oversee a portfolio of related programs but do not directly manage them. (See page 20.)

The Deputy Secretary should ensure that the Under Secretary for Oceans and Atmosphere in his role on the EXCOM works with the other members of the EXCOM to obtain and review regular, independent evaluations of the status of NPOESS. In particular, such evaluations should thoroughly assess the progress toward completing high-risk or otherwise critical tasks and the associated impact of any problems encountered. (See page 12.) Also, The Deputy Secretary should ensure that the Under Secretary for Oceans and Atmosphere in his role as a member of the EXCOM works with the other members of the EXCOM to (1) Critically review and revise the NPOESS award fee plan, and (2) Assign responsibility for determining fee awards to an official who does not directly manage the NPOESS program. (See page 24.)

In his written response to the draft report, the Deputy Secretary noted how important both he and the Secretary of Commerce consider the NPOESS program to the Department's mission to the nation. He indicated that since becoming aware of the issues associated with NPOESS last year, he has received monthly updates from NOAA and has met with the chief executive officers and other senior executives of the prime contractor and the VIIRS subcontractor. He stated that he takes the report's findings and recommendations seriously, along with those he expects will result from the Nunn-McCurdy certification process. Once that process is complete, he indicated that he will work with the Under Secretary for Oceans and Atmosphere and the EXCOM partners at DoD and NASA to ensure that the intent of both our recommendations and those of the Nunn-McCurdy process are reflected in the management, oversight, and execution of the NPOESS program. The Deputy Secretary's response is included as an appendix to this report.

In his written response to our draft report, the Under Secretary for Oceans and Atmosphere generally agreed with the intent of our recommendations but also stated that the draft report does not (1) adequately acknowledge the complexity of the NPOESS program; (2) represent the ongoing level of direct involvement by the EXCOM in oversight of the IPO and NPOESS program, (3) fully characterize the award fee structure of the NPOESS contract, and (4) adequately recognize the DoD role in administration of the NPOESS contract.

Summary of NOAA's Response

EXCOM Did Not Effectively Challenge Optimistic Assessments of the Impact of VIIRS Problems on NPOESS.

NOAA emphasized that NPOESS is one of the most complex environmental satellite programs ever undertaken and noted that few programs have carried out a total system development of this nature. NOAA argued that throughout its existence, EXCOM has been concerned with the overall direction of NPOESS, given its technical complexity and aggressive schedule. NOAA stated that EXCOM continued to provide direction to the IPO concerning budget and schedule assumptions, as well as program progress, and EXCOM members held private discussions with senior NPOESS contractor executives regarding their concerns. NOAA described additional actions taken by EXCOM including tasking several independent reviews (five reviews since 2004 were cited in NOAA's response), and proposing an independent management structure called a Program Executive Office (PEO) to oversee the IPO. NOAA also noted that the program was funded and structured at a level expected to provide a 50 percent probability of success.

In response to our recommendation to obtain regular independent reviews of NPOESS, NOAA said that EXCOM has been actively and directly involved in the oversight and management of NPOESS, including proposing a PEO responsible for conducting ongoing independent analysis and reviews of the NPOESS program. NOAA also stated that the tri-agency partners are already conducting monthly reviews, and will conduct major independent reviews related to the major milestones of the program. Noting that the Nunn-McCurdy process will determine the future management structure, NOAA stated that it is committed to building on its already effective working relationship with the other EXCOM members to ensure effective management and oversight of NPOESS.

OIG Comments

NPOESS is clearly an extraordinarily complex program. NOAA, OIG, and all interested parties agree on this. But it is precisely because of this complexity that we would have expected much closer and documented oversight by EXCOM. Because NPOESS was budgeted for a 50 percent probability of success, the need for close and continuous oversight was all the more critical. While budgeting at this level suggests NPOESS had an equal chance of being either under or over budget, a May 2003 report by a joint task force of the Defense Science Board and Air Force Scientific Advisory Board points out that this budgeting philosophy is seriously flawed. According to this report, budgeting at a 50/50 probability level erroneously assumes that areas of increased risk and lower risk will balance each other out; in fact, particularly on space programs, risk and cost are significantly skewed upward because of the daunting engineering challenges of operating in the harsh environment of space. The report recommends budgeting for an 80 percent probability of success, a level the task force believes to be the most probable cost.

Although NOAA's response maintained that EXCOM was directly involved in NPOESS oversight and described various actions taken, including requesting independent studies, the

response identifies little in the way of decisions or impacts resulting from these actions. Moreover, EXCOM's request for two of the five studies identified in the response and its proposal to establish a PEO were not proactive measures taken to gain control of a deteriorating program; rather, they were steps taken in reaction to a crisis—learning that the first NPOESS launch would be delayed. The two independent reviews were requested in August 2005, well after the NPOESS launch delay had been identified. The first was an independent cost analysis to determine whether a Nunn-McCurdy breach had occurred, and the second was an independent program assessment largely to support the Nunn-McCurdy process. The PEO was not proposed until November 2005. Moreover, the results of another independent review conducted in 2004 and cited in NOAA's response—an independent cost analysis focusing on sensor integration—yielded schedule and cost estimates considerably higher than those of the IPO, yet there is no indication that EXCOM questioned whether the IPO's estimate should be used.

NOAA's response states that it agrees with the intent of our recommendation but suggests that it is already obtaining regular, independent reviews of the NPOESS program. It is important to highlight here that the intent of this recommendation is for a process to be established through which qualified individuals who are independent of the NPOESS program and not responsible for its management conduct regular reviews of NPOESS (e.g., on a quarterly or semiannual basis, as well as at major milestones) to determine the program's status and risks relative to the new budget, schedule, and technical requirements baseline established during Nunn-McCurdy certification. Collectively, these individuals should have extensive space program experience; expertise in management, acquisition, systems engineering, and verification and testing of large space systems; the requisite technical, cost, and programmatic expertise; and an understanding of the current thinking on best practices for acquisition of large space systems. Results and recommendations should be documented and provided both to EXCOM and the Deputy Secretary of Commerce.

Summary of NOAA's Response

Contractor Received Excessive Award Fees for a Problem-Plagued Program.

In its response, NOAA criticized the draft report's second finding (1) for failing to fully characterize the award fee structure of the NPOESS contract, (2) for not adequately recognizing that the NPOESS contract was a DoD contract and therefore subject to the rules, regulations and oversight of the Air Force, not the DOC, and (3) for failing to consider the March 29, 2006, DoD policy on the administration of award fees.

OIG Comments

With regard to NOAA's first concern, we believe the report carefully, accurately, and correctly describes the NPOESS fee structure. In its written response, NOAA provided some general information about the fee structure—all of which is already included in the report. It also noted its belief that the structure was commensurate with the program's complexity and the risk level inherent in the baseline program. While we agree that the NPOESS program is complex and have clearly noted the impact its high-risk nature could have on the fee amount in the report, we believe it is fair—if not essential—to at least question the decision to allow an award fee pool of

up to 20 percent, particularly in light of the fact that such an amount is unusual even at the Department of Defense, where high-risk, complex programs are not uncommon.

With regard to NOAA's second point, the report's first page clearly states that "[i]n August 2002, the IPO, using DoD's contracting authority, awarded a single satellite integration contract worth $4.5 billion to a prime contractor..." Furthermore, our description of the IPO structure clearly indicates that DoD has lead responsibility for acquisition matters. We therefore made no changes to the draft text to address this concern. In addition, although the contract may have been awarded according to DoD rules and regulations, given that half of the program's funding comes from the Department of Commerce, we believe it is appropriate for us as well as for NOAA and the Department to examine the management of the contract's award fee.

Finally, we are pleased to acknowledge the new DoD policy on award fee contracts, which resulted from the December 2005 GAO review of award and incentive fees at DoD that we discuss in our audit. That policy addresses many of the issues we raised with regard to the NPOESS award fee structure and, if it is implemented in the NPOESS contract, should address our concerns about the need for adequate incentives for high-risk, critical tasks, with rolling over unearned fees to subsequent periods, and with paying fee for unsatisfactory performance. The policy does not address all of our concerns, however. Specifically, it is silent on the issue of whether interim fee should be paid when mission success milestones are missed and on whether the award fee amount for this contract is excessive. In addition, as our report notes, one of the reasons we raised all of the issues about the NPOESS award fee structure is so that NOAA could properly consider those issues when crafting award fee plans for future major acquisitions. Given the fact that NOAA is currently engaged in its first major satellite acquisition, we thought it critical to bring the problems we found with the NPOESS fee structure to its attention.

In its response to our first recommendation for this finding, NOAA indicated that, in light of the new DoD policy on award fee management, EXCOM will review the current award fee structure to determine the specific changes needed to ensure compliance with the DoD policy. As noted previously, that policy does not address all of the issues we raised with regard to the current award fee structure, NOAA's response therefore fails to address what changes the Under Secretary for Oceans and Atmosphere will recommend to EXCOM to address our concerns about whether interim fee should be paid when mission success milestones are missed and whether the award fee amount for this contract is excessive.

NOAA's response to our recommendation concerning the responsibility for determining fee awards indicated that EXCOM has already addressed this recommendation with the proposed establishment of the PEO. If this position is established and the PEO is not directly responsible for managing the NPOESS program, that action should meet the intent of our recommendation.

NOAA's response is included in its entirety as an appendix to this report.